SEMESTER END EXAMINATION, APRIL-MAY, 2025

Course Name: - BPO **Semester:- BPO 2nd Year**

Paper Name: - Biomechanics - II **Paper Code:- BPO 204**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions. Each question carries **10 marks.**

Section – A
Objective Questions

1. Answer all the following questions. **5x3 =15**

i. Which knee mechanism provides the most stability for a new transfemoral amputee?

a. Polycentric knee
c. Microprocessor knee
b. Hydraulic knee
d. Manual locking knee

ii. Which gait deviation is commonly associated with inadequate hip extension strength in transfemoral amputees?

a. Circumduction
c. Lateral trunk bending
b. Vaulting
d. Foot slap

iii. During which phase of gait is the center of mass at its highest point?

a. Initial contact
c. Terminal stance
b. Mid-stance
d. Mid-swing

iv. Which of the following gait parameters typically increases with age?

a. Double support time
c. Gait speed
b. Cadence
d. Step length

v. In which class of lever is the effort arm always greater than the resistance force?

a. First-class lever
b. Second-class lever
c. Third-class lever
d. All lever classes can have effort greater than resistance

Section – B
Short Answer Questions

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2. Answer any five of the following questions. 5x7=35

i. Briefly elaborate about the plantar flexion moment at foot & flexion moment at knee during stance phase of Gait Cycle.

ii. Briefly discuss about the biomechanical consideration of different socket design in case of Through Knee Amputation. 6

iii. Determinants of Gait. 6

iv. Briefly discuss about the shifting of GRF vector from Weight Acceptance Phase to SLS Phase of Gait Cycle with a neat line diagram. 6

v. Floor Reaction Orthosis and its biomechanical consideration. 4

vi. Discuss about gait deviation in case of Transfemoral Prosthesis.

vii. Lever 4

Section – C
Descriptive Questions

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3. Answer any two of the following question. 2x10=20

i. Define Normal Human Locomotion. Discuss about the Weight Acceptance Phase, SLS Phase & Swing Limb Advancement Phase of Gait Cycle with a neat line diagram. 9

ii. Consider about different socket design in case of Above Knee Amputation and briefly elaborate about its Prosthetic management and its biomechanical implication.

iii. Discuss about biomechanics of KAFO & HKAFO and elaborate about application of three/four/five-point force system. 10 8

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